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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	10/619,890
Filing Date	07/15/2003
First Named Inventor	David M. Forman
Art Unit	3641
Examiner Name	Daniel L. Greene, Jr.
Attorney Docket Number	BRI/023

ENCLOSURES *(Check all that apply)*

- ☒ Fee Transmittal Form
  - ☒ Fee Attached (Form PTO2038)
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance communication to Technology Center (TC)
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
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- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Law Offices of Thomas J. Brindisi
Signature	/ Thomas J. Brindisi /
Date	February 9, 2005

CERTIFICATE OF TRANSMISSION/MAILING

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PTO/SB/17 (10-03)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT $500.00

Complete if Known	
Application Number	10/619,890
Filing Date	07/15/2003
First Named Inventor	David M. Forman
Examiner Name	Daniel L. Greene, Jr.
Art Unit	3641
Attorney Docket Number	BRI/023

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
				SUBTOTAL (1)	$0.00

2. EXTRA CLAIM FEES FOR UTILITY & REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims	20	- 20 =	0	X	$18.00	=	$0.00
Independent Claims	3	- 3 =	0	X	$86.00	=	$0.00
Multiple Dependent			0	X	$290.00	=	$0.00

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43**	Reissue independent claims over original patent
1205	18	2205	9**	Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) $0.00

***or number previously paid, if greater; For Reissues , see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251		2251	55	Extension for reply within first month	
1252		2252	210	Extension for reply within second month	
1253		2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	500
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
Other fee (specify) _____					

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) $500.00

SUBMITTED BY

(Complete *(if applicable)*)

Name (Print/Type)	Thomas J. Brindisi	*Registration No. (Attorney/Agent)*	40,348	*Telephone*	(310) 439-2901
Signature	/ Thomas J. Brindisi /			*Date*	February 9, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of **David M. Forman et al.**

Serial No.: 10/619,890

Filed: 07/15/2003

Title: "Firing-Readiness Diagnostics of a Pyrotechnic Device Such as an Electronic Detonator"

Technology Center 3600

(Group Art Unit 3641 / Examiner Daniel L. Greene, Jr.)

APPEAL BRIEF

Mail Stop **APPEAL BRIEF - PATENTS**
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Alexandria, Virginia 22313-1450

Submitted by
Thomas J. Brindisi, Reg. No. 40,348
Law Offices of Thomas J. Brindisi
20 28th Place, Suite B
Venice, California 90291
Tel. (310) 439-2901
Fax. (310) 439-2902

CERTIFICATE OF MAILING (37 C.F.R. §1.10)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as 'Express Mail Post Office To Addressee' in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, Express Mail Label No. EU777573653US.

February 9, 2005
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/ Thomas J. Brindisi /
Thomas J. Brindisi

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TABLE OF CONTENTS

(1) Real Party in Interest

The real party in interest in this application is Special Devices Incorporated, which is incorporated under the laws of Delaware and has its principal place of business at 14370 White Sage Road, Moorpark, California 93021.

(2) Related Appeals and Interferences

No related appeals or interferences are known to appellant, counsel, or assignee.

(3) Status of Claims

At the time of filing the notice of appeal in this case, claims 1 through 21 had been presented, of which claim 8 had been canceled, and claims 2, 6, 9, and 16-21 withdrawn. In an amendment filed with this Brief, withdrawn claims 2, 6, 9, and 16-21 have been canceled. Thus, presently pending are claims 1, 3-5, 7, and 10-15, all of which stand rejected and are subject to this appeal.

(4) Status of Amendments

After the Final Office Action mailed on August 9, 2004, an amendment was filed on October 12, 2004, which was noted as entered in an October 26, 2004 Advisory Action. As noted above, a further amendment is being filed on the same day as this Brief canceling claims 2, 6, 9, and 16-21.

(5) Summary of the Claimed Subject Matter

Independent claim 12 is directed to an electronically connected system for use in mining or blasting (¶21 and Fig. 1) and comprising a master device (id., ref. 40 or "logger" (not shown)) with a bus (id., ref. 18) connected to it, and a plurality of electronic detonators (Fig. 3 and ¶26, ref. 20) connected to the bus and each comprising an igniter (Fig. 3 and ¶26, ref. 28) and electronic circuitry (Figs. 3-5 and ¶¶26-29, refs. 23-26 & 30) configured and/or programmed to perform one or more electronic detonator firing-readiness diagnostics (¶¶3-6, Figs. 3-5 and ¶¶26-29, refs. 23-26 & 30). Such diagnostics include a resistance check for firing readiness of the detonator's ignition element, a simpler continuity check for firing readiness of the detonator's ignition element (Figs. 3 & 4 and ¶¶51 & 60, ref. 30, including, e.g., a MOSFET switch), a capacitance verification of the detonator's firing capacitor (Figs. 3 & 4 and ¶¶64-65, including, e.g., a current-mirror using bipolar transistors or MOSFETs, a fixed gate-source voltage on a JFET or a MOSFET, or a current feedback using an op amp or comparator), and/or a check for incompatible devices connected to the bus (¶¶6 & 53). Independent claim 1 is directed to an electronic detonator as just described with respect to claim 12.

Claims 3-5, 10, 11, 13, and 14 further define the claimed electronic detonator by specifying that its igniter includes an

ignition element and that its electronic circuitry comprises or includes a continuity check module. (See Figs. 3 & 4 and ¶¶51 & 60, ref. 30, including, e.g., a MOSFET switch).

Claims 7, 10, 11, and 13-15 further define the claimed electronic detonator by specifying that its igniter includes a firing capacitor (¶27 and Figs. 3 & 4, ref. 26), and that its electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value. (See Figs. 3 & 4 and ¶¶64-65, including, e.g., current-mirror using bipolar transistors or MOSFETs, a fixed gate-source voltage on a JFET or a MOSFET, or a current feedback using an op amp or comparator).

(6) Grounds of Rejection To Be Reviewed

The presently-appealed rejections are of all pending claims as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,166,452 to Adams et al. ("Adams"; a copy of this patent is included in the Evidence Appendix at **tab 1**).

(7) Argument

The following argument is divided into four sections, based on the following claim limitations that are not adequately disclosed by Adams: (a) independent claims 1 and 12 each recite an "electronic detonator" that is "for use in mining or blasting" and that has "electronic circuitry configured and/or programmed to perform one or more firing-readiness diagnostics";

(b) dependent claims 3-5 also recite that the detonator includes an "ignition element" and a "continuity check module"; (c) dependent claims 7 and 15 also recite that the "electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value"; and (d) dependent claims 10, 11, 13, and 14 also recite both of the limitations of (b) and (c) just noted.

(a) Independent claims 1 and 12 each recite an "electronic detonator" that is "for use in mining or blasting" and has "electronic circuitry configured and/or programmed to perform one or more firing-readiness diagnostics"

As explained in the present application at ¶2, prior to the present invention, it is believed that "electronic blasting systems have not employed firing-readiness diagnostics of even critical parts of the electronic detonators such as the firing capacitors and ignition element [and] therefore have not permitted the detection and replacement of any detonators that have faulty firing capacitors or ignition elements prior to firing." Adams, on the other hand, is directed to an igniter for use in gas generators in vehicle safety systems. It is well-known that a "detonator" *detonates an explosive*,[1] while an igniter for a gas generator is not intended to detonate an explosive, but merely to trigger the *burning* - not *detonation* - of a gas generant such as is used to inflate an airbag. An

[1] Merriam Webster's Collegiate Dictionary, 10th Ed., defines a "detonator" as a device "used for detonating a high explosive."

automotive igniter is thus a significantly different structure, and performs significantly different functions, than a detonator for use in mining and blasting.

Consequently, in response to the rejection of all original claims as anticipated by Adams, Applicant amended all claims to include the limitations that the pyrotechnic device is an "electronic detonator" that is "for use in mining or blasting" and has "electronic circuitry configured and/or programmed to perform one or more firing-readiness diagnostics," which limitations are present in all appealed claims. The same rejections were maintained and made final, however. The final rejection includes a section entitled "Response to Arguments," which discusses the addition of the limitation "for use in mining and blasting," but does not address the added limitation, "electronic detonator," or the clear structural and functional differences between a detonator and the igniter disclosed by Adams.[2]

Although the first paragraph of the background of Adams states that "It would also be advantageous to have similar capabilities for selectively [i.e., simultaneously or sequentially depending upon selected variables] igniting various

[2] Also, while that section mentions the limitation "for use in mining and blasting," it does not address how the device of Adams could meet that limitation except by a reference to the ensuing rejections, none of which addresses that limitation.

units of reactive materials, such as explosives, in mining or demolition operations" (col. 1, lines 23-26), it is submitted that Adams does not adequately disclose the claimed electronic detonator having firing-readiness diagnostics, because "one of ordinary skill in the art could [not] have combined [Adams'] description … with his own knowledge to make the claimed invention." In re Donohue, 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985); MPEP 2121.01. To the contrary, the quoted passage of Adams is nothing more than a general, tangential, and non-enabling background comment that has nothing to do with the rest of the patent's disclosure. The entire remainder of the patent is directed solely to an igniter specifically for use in vehicle safety systems, and it does not remotely connect the quoted background comment with the patent's actual disclosure of such an igniter. Instead, in the closing remarks concerning the breadth of possible applications for the invention, Adams states that "It is understood that the gas generator shown in Figs. 8 and 9 is merely exemplary and that the igniter of the present invention may be used with any gas generator design, and that a single gas generator device may be assembled with more than one igniter of the present invention. It is understood that the igniters of the present invention may also be used with hybrid airbag inflators." (Col. 7, lines 2-8 (emphasis added)).

Even if the quoted background comment of Adams were reasonably connected in some way to the patent's disclosure (which it is not), it would still be at best no more than a wishful statement of a goal or objective for which no solution is reasonably taught or suggested, because there is no disclosure as to how the disclosed igniter could be modified for use with detonators used in mining or blasting. Indeed, Adams contains no suggestion, much less enabling teaching, of how to successfully incorporate such an igniter into a detonator for use in mining and blasting. Moreover, the incorporation of a hermetically-sealed automotive-style igniter into a detonator - a key advance that permits the claimed firing-readiness diagnostics to be implemented - was not within the ordinary skill in the art at the time. As stated in the Declaration of Abrar A. Tirmizi (Evidence Appendix, **tab 2**) submitted in support of the amendment filed prior to the final rejection in this application:

> [P]roviding a hermetically sealed initiator in a conventional fashion requires circumferential welds. To fit in a standard detonator shell, however, an ignition element must have a significantly smaller diameter than automotive initiators, resulting in a significantly higher surface to volume ratio and concomitantly reduced heat-sink for the heat generated by welding, presenting a well-known impediment to the welding of such

> devices. Further, reducing the header of [an automotive initiator] proportionally results in problems of insulator glass-cracking during welding. ...

Tirmizi Decl., ¶4.[3] Although these statements were made in the context of an obviousness determination in another application (relating more directly to the incorporation of the automotive-style igniter into a detonator) assigned to Applicant, they equally support a determination in the present context that there is not adequate (or inherent) disclosure in Adams of a detonator for use in mining and blasting having firing-readiness diagnostics features as is claimed.

(b) Dependent claims 3-5 also recite that the detonator includes an "ignition element" and a "continuity check module"

The following arguments incorporate by reference, and apply in addition to, the preceding arguments of section (a) regarding independent claims 1 and 12. Dependent claims 3-5 further recite that the electronic circuitry includes a continuity check module. As explained in the application at ¶3, rather than using a full-blown resistance test to determine firing-readiness of the detonator's ignition element, that check "[a]lternately ... may be accomplished with a simple continuity check in

[3] For these and a number of other reasons, workers in the detonator field did not look to art in the automotive igniter field and vice versa. Id., ¶3.

conjunction with an appropriately selected ignition element, system operating voltage, and minimum resistance setting for the continuity check." As further explained, such a check is an improvement over a full-blown resistance test because it permits "the ignition element [to] be checked with a small amount of current … by circuitry that is relatively compact." As noted above, details of a continuity check are described and illustrated at Figs. 3 & 4 and ¶¶51 & 60.

The appealed rejection, at page 5, section 9, states that "In regards to claim 3, Adams inherently discloses, wherein the electronic detonator includes an ignition element (55), and the electronic circuitry comprises a continuity check module, in the rejection of the corresponding parts of claim 1, above." The incorporated-by-reference rejection of claim 1 does not specifically refer to the disclosure of a continuity check module, however, and instead generally cites Adams' Figs. 2, 3, 5-7 & 10, and col. 2, lines 59-60, col. 3, lines 62-67, col. 4, lines 1-12, 14-16 & 64-67, and col. 5, lines 24-32. Upon a review of these portions, and the remainder, of Adams, it appears that the only possibly relevant portions are col. 5, lines 26-27 and 63, which disclose the comparison of "firing loop (heating means activation circuitry) integrity data to predetermined limits." But it is unclear what Adams means by "integrity data," or what tests may or may not be involved in

"comparing … firing loop (heating means activation circuitry) integrity data to predetermined limits."

While the appealed rejection states that a continuity check module is ***inherently*** disclosed (presumably by the quoted passage), it is respectfully submitted that the burden of proving inherent disclosure (see MPEP 2112) is not met by the rejection's incorporated reference to numerous parts of Adams without any particularized relevant references, explanation, or rationale. To the contrary, "[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990); see also MPEP 2112, third heading ("Examiner Must Provide Rationale or Evidence Tending to Show Inherency").

(c) Dependent claims 7 and 15 also recite that the "electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value"

The following arguments incorporate by reference, and apply in addition to, the preceding arguments of section (a) regarding independent claims 1 and 12. Dependent claims 7 and 15 further recite that the electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance

above a first value and below a second value. As explained in the application at ¶4, "capacitance verification of a firing capacitor in the device" may for example be accomplished by "imposing minimum and/or (preferably and) maximum time limits for charging of the capacitor from a substantially uncharged state to a predetermined charged state using a controlled charging process." In that case, simply charging the detonator (without receiving an error message) can "effectively provide a verification of the proper capacitance of the firing capacitor 26 if a charging window time as described above [in ¶64] is employed, and its limits are respectively defined to correspond to the time required (using the selected charging process) to charge a firing capacitor 28 having the upper and lower limits of acceptable capacitance." ¶65; see also Figs. 3 & 4 and ¶¶64-65, discussing, e.g., current-mirror using bipolar transistors or MOSFETs, a fixed gate-source voltage on a JFET or a MOSFET, or a current feedback using an op amp or comparator.

The appealed rejection states at page 6 that "In regards to claim 7, Adams inherently discloses, wherein the igniter includes an firing capacitor (56), and the electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value, in figure 7, column 4, lines 59-61, and column 5 lines 24-32 and lines 58-65." Upon a review of these portions,

and the remainder, of Adams, as is implicit from the rejection's statement that the disclosure is inherent, there is no clear express disclosure of a capacitance check. It is respectfully submitted that the burden of proving inherent disclosure (see MPEP 2112) by providing "a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art," Levy, 17 USPQ2d at 1464, has not been met because there is no rationale to support a determination that a capacitance check necessarily flows from Adams' teachings.

Further, to the extent that the claim language at issue is construed pursuant to 35 U.S.C. §112, ¶6, the specific preferred means disclosed in the present application involves using a selected charging process (e.g., constant current, rail voltage limited process using, e.g., a current-mirror using bipolar transistors or MOSFETs, a fixed gate-source voltage on a JFET or a MOSFET, or a current feedback using an op amp or comparator as described in ¶64) itself to simultaneously effect the capacitance check. Adams does not disclose (inherently or otherwise) such a means for effecting a capacitance check, or equivalent structure.

(d) Dependent claims 10, 11, 13, and 14 also recite each of the limitations of sections (b) and (c) above

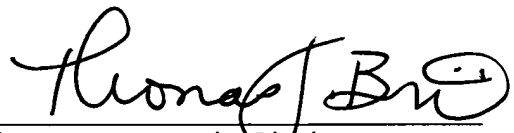
The arguments of all of the preceding sections (a), (b), and (c) are incorporated by reference here, as all apply to claims 10, 11, 13, and 14, each of which contains all of the relevant limitations discussed in those sections.

***

Following this page is an Appendix setting forth the pending appealed claims, and an Appendix containing the relevant evidence for this Appeal. Appellant respectfully requests that the present Appeal be acted upon favorably.

Respectfully submitted,
Law Offices of Thomas J. Brindisi

Dated: February 9, 2005

By: 
Thomas J. Brindisi
Reg. No. 40,348

20 28th Place, Suite B
Venice, California 90291
Tel. (310) 439-2901
Fax. (310) 439-2902

(8) Claims Appendix

Rejected claims 1, 3-5, 7, and 10-15 are subject to this appeal and read as follows as presently pending:

1. An electronic detonator for use in mining or blasting and having firing-readiness diagnostics, comprising an igniter and electronic circuitry configured and/or programmed to perform one or more firing-readiness diagnostics on said electronic detonator.

3. The electronic detonator of claim 1, wherein said igniter includes an ignition element, and said electronic circuitry comprises a continuity check module.

4. The electronic detonator of claim 3, wherein said electronic detonator includes an application-specific integrated circuit that contains said electronic circuitry.

5. The electronic detonator of claim 4, wherein said igniter is hermetically sealed, and said ignition element is a bridgewire.

7. The electronic detonator of claim 1, wherein said igniter includes a firing capacitor, and said electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value.

10. The electronic detonator of claim 7, wherein said igniter further includes an ignition element, and said electronic circuitry includes a continuity check module.

11. The electronic detonator of claim 10, wherein said igniter is hermetically sealed, and said ignition element is a bridgewire.

12. An electronically connected system for use in mining or blasting comprising:

a) a master device;

b) a bus connected to said master device; and,

c) a plurality of electronic detonators connected to said bus, each said electronic detonator comprising an igniter and electronic circuitry configured and/or programmed to perform one or more electronic detonator firing-readiness diagnostics.

13. The electronically connected system of claim 12, wherein said igniter includes a firing capacitor, and said electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value.

14. The electronically connected system of claim 13, wherein said igniter further includes an ignition element, and said electronic circuitry includes a continuity check module.

15. The electronically connected system of claim 14, wherein said igniter is hermetically sealed, and said ignition element is a bridgewire.

(9) Evidence Appendix

TAB 1 - U.S. Patent No. 6,166,452 to Adams et al.

(Entered in record in first Office Action mailed 12/19/03)

TAB 2 - Declaration of Abrar A. Tirmizi

(Entered in record with amendment filed 4/19/04)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: John J. Walsh, et al.
Appl. No.: 10/158,529
Filed: May 29, 2002
Title: "Standalone Ignition Subassembly for Detonators"

Group/A.U.: 3641
Examiner: Bret C. Hayes

Docket No.: BRI/002

DECLARATION UNDER 37 C.F.R. § 1.132

I, Abrar A. Tirmizi, do declare and state as follows:

1. All statements herein are made based on my own personal knowledge except where it is indicated that a statement is based on information and belief. All statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I am an inventor listed on the above-identified patent application ("this patent application"). I am a staff Senior Packaging Engineer at Special Devices and have worked in the pyrotechnic industry for about five years, including almost the last three years on Special Devices' electronic detonators. I hold a B.Sc. in Applied Physics from the University of Karachi (1979), a B.S. in Mechanical Engineering from the University of Texas (1985), and an M.S. in Engineering Management from California State Northridge (1991).

3. I am familiar with U.S. Patent No. 6,079,332 to Marshall et al. ("Marshall") and U.S. Patent No. 5,988,069 to Bailey ("Bailey"). Marshall is analogous art to the subject matter claimed in this application, but, though it is cross-referenced to the same class as Marshall, Bailey is not analogous art to this application. Bailey is directed specifically to an automotive airbag initiator, which art is not analogous to detonators such as claimed in this application, which are used in blasting and mining. Persons of ordinary skill in the detonator art would not have, at the time of the invention of this application, considered or referred to technology in the automotive initiator field to address problems in or modify the designs of, detonators. To the contrary, technical conferences in the detonator field are separate from, and do not overlap with, technical conferences in the automotive initiator field. Similarly, those skilled in the design and manufacture of initiators would generally not have a background in mining or the pyrotechnic products used therein. The technical issues are quite different, and automotive initiators are not pertinent to the problems involved in detonator design. The design of electronic detonators is approached completely differently, and involves vastly different considerations. One reason for the difference in design strategies between detonators and automotive initiators is that in detonator systems, all detonators are intended to deploy – every single one on the system – in response to a single signal; in contrast, only one or a selected small number of initiators are intended to deploy in response to a signal. Another reason for the difference is that, on the other hand, the manufacture and assembly of the structural and pyrotechnic components of detonators is in general more "low-tech" and often relies upon hand-assembly, whereas initiator manufacture tends to be highly automated and focuses intensively on extremely high reliability.

4. In addition to being non-analogous art, there was no suggestion or motivation existing at the time of the present invention to modify the teachings of Marshall with Bailey by substituting the hermetically sealed automotive initiator of Bailey for the ignition element of Marshall. To the contrary, one of ordinary skill in the detonator art would have been clearly led away from such a modification for a number of reasons, including those set forth in the preceding paragraph. Further, providing a hermetically sealed initiator in a conventional fashion requires circumferential welds. To fit in a standard detonator shell, however, an ignition element must have a significantly smaller diameter than automotive initiators, resulting in a significantly higher surface to volume ratio and concomitantly reduced heat-sink for the heat generated by welding, presenting a well-known impediment to the welding of such devices. Further, reducing the header of Bailey proportionally results in problems of insulator glass-cracking during welding. For these and other reasons, even if one of ordinary skill in the detonator art had considered the (non-analogous) Bailey patent, he would have been led away from using its teachings to modify a detonator to incorporate a hermetically sealed ignition element. Finally, there was no motivation for one of ordinary skill in the art to make such a combination because there was no recognition of the applications and benefits that would follow from the provision of a hermetically sealed ignition element (along with an encapsulated body) in a detonator. As explained by the Applicant in the present application, those benefits include the ability to handle and transport detonator electronic ignition subassemblies *apart from* detonator shells and charges, which in turn provides many potential advantages in the use and interchangeability of electronic detonators.

5. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001), and may jeopardize the validity of this patent application or any patent issuing thereon.

Abrar A. Tirmizi

Date: March 15, 2004